

**What is Claimed is:**

- 5 1. A rock bit comprising:  
a body;  
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;  
a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a  
10 hardfacing comprising:  
steel in the range of from 20 to 50 percent by weight; and  
filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having a particle size between about 16 to 40 mesh.
- 15 2. The rock bit of claim 1 comprising filler in the range of from 60 to 75 percent by weight.
- 20 3. The rock bit of claim 1 wherein the filler comprises in the range of from 20 to 50 percent by weight spherical cast tungsten carbide particles.
4. The rock bit of claim 1 wherein the filler comprises in the range of from 40 to 100 percent by weight spherical cast tungsten carbide particles.
- 25 *20-50* 5. The rock bit of claim 1 wherein the filler comprises tungsten carbide particles selected from the group consisting of spherical cemented, crushed cemented, crushed cast, crushed macrocrystalline, and carburized.
- a* 6. The rock bit of claim 5 wherein the <sup>filler</sup> comprises spherical cast tungsten carbide  
30 particles having a particle size between about 80 to 200 mesh.
7. The rock bit of claim 6 wherein the filler comprises spherical cast tungsten carbide particles having a particle size between about 100 to 200 mesh.
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a 8. The rock bit of claim 5 wherein the filler <sup>further</sup> comprises macrocrystalline tungsten carbide particles having a particle size between about 40 to 80 mesh.

5 <sup>Sub a</sup> 9. A rock bit as recited in claim 1 wherein the hardfacing comprises ultra-fine tungsten carbide particles in the range of from 10 to 35 percent by weight of the filler material, the particles having a particle size in the range of from about 1 to 50 microns.

10 10. A rock bit as recited in claim 9 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.

11. A rock bit as recited in claim 9 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.

15 12. A rock bit comprising:  
a body;  
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;  
20 a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising:

25 steel in the range of from 20 to 50 percent by weight;  
filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having a particle size between about 80 to 200 mesh.

30 13. The rock bit of claim 12 comprising filler in the range of from 60 to 75 percent by weight.

14. The rock bit of claim 12 wherein the filler comprises in the range of from 20 to 50 percent by weight spherical cast tungsten carbide particles.

35 15. The rock bit of claim 12 wherein the filler comprises in the range of from 40 to 100 percent by weight spherical cast tungsten carbide particles.

16. The rock bit of claim 12 wherein the filler comprises spherical cast tungsten carbide particles having a particle size between about 100 to 200 mesh.

5 *sub a3* 17. The rock bit of claim 12 wherein the filler comprises spherical cast tungsten carbide particles having a particle size between about 16 to 40 mesh.

10 18. The rock bit of claim 12 wherein the filler comprises tungsten carbide particles selected from the group including spherical cemented, crushed cemented, crushed cast, and crushed macrocrystalline.

19. The rock bit of claim 18 wherein the filler *further* comprises macrocrystalline tungsten carbide particles having a particle size between about 40 to 80 mesh.

15 *sub a4* 20. A rock bit as recited in claim 12 wherein the hardfacing comprises ultra-fine tungsten carbide particles in the range of from 10 to 35 percent by weight of the filler material, the particles having a particle size in the range of from about 1 to 50 microns.

20 21. A rock bit as recited in claim 20 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.

22. A rock bit as recited in claim 20 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.

25 23. A rock bit comprising:  
a body;  
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;  
30 a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising:  
steel in the range of from 20 to 50 percent by weight;

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filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having a particle size between about 16 to 40 mesh and between about 80 to 200 mesh.

5 *pl*  
*as* > 24. A rock bit as recited in claim 23 wherein the hardfacing comprises ultra-fine tungsten carbide particles in the range of from 10 to 40 percent by weight of the filler material, the particles having a particle size in the range of from about 1 to 50 microns.

10 25. A rock bit as recited in claim 24 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.

15 26. A rock bit as recited in claim 24 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.

20 27. The rock bit of claim 23 wherein the filler comprises spherical cast tungsten carbide particles having a particle size between about 100 to 200 mesh.

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